The New York Times
nytimes.com

October 24, 2005
The Cost of Gold | 30 Tons an Ounce

Behind Gold's Glitter: Torn Lands and Pointed Questions

By JANE PERLEZ and KIRK JOHNSON

There has always been an element of madness to gold's allure.

For thousands of years, something in the eternally lustrous metal has driven people to the outer edges of desire - to have it and hoard it, to kill or conquer for it, to possess it like a lover.

In the early 1500's, King Ferdinand of Spain laid down the priorities as his conquistadors set out for the New World. "Get gold," he told them, "Humanely if possible, but at all costs, get gold."

In that long and tortuous history, gold has now arrived at a new moment of opportunity and peril.

The price of gold is higher than it has been in 17 years - pushing $500 an ounce. But much of the gold left to be mined is microscopic and is being wrung from the earth at enormous environmental cost, often in some of the poorest corners of the world.

And unlike past gold manias, from the time of the pharoahs to the forty-niners, this one has little to do with girding empires, economies or currencies. It is almost all about the soaring demand for jewelry, which consumes 80 percent or more of the gold mined today.

The extravagance of the moment is provoking a storm among environmental groups and communities near the mines, and forcing even some at Tiffany & Company and the world's largest mining companies to confront uncomfortable questions about the real costs of mining gold.

"The biggest challenge we face is the absence of a set of clearly defined, broadly accepted standards for environmentally and socially responsible mining," said Tiffany's chairman, Michael Kowalski. He took out a full-page advertisement last year urging miners to make "urgently needed" reforms.

Consider a ring. For that one ounce of gold, miners dig up and haul away 30 tons of rock and sprinkle it with diluted cyanide, which separates the gold from the rock. Before they are through, miners at some of

the largest mines move a half million tons of earth a day, pile it in mounds that can rival the Great Pyramids, and drizzle the ore with the poisonous solution for years.

The scars of open-pit mining on this scale endure.

A months-long examination by The New York Times, including tours of gold mines in the American West, Latin America, Africa and Europe, provided a rare look inside an insular industry with a troubled environmental legacy and an uncertain future.

Some metal mines, including gold mines, have become the near-equivalent of nuclear waste dumps that must be tended in perpetuity. Hard-rock mining generates more toxic waste than any other industry in the United States, according to the Environmental Protection Agency. The agency estimated last year that the cost of cleaning up metal mines could reach $54 billion.

A recent report from the Government Accountability Office chastised the agency and said legal loopholes, corporate shells and weak federal oversight had compounded the costs and increased the chances that mining companies could walk away without paying for cleanups and pass the bill to taxpayers.

"Mining problems weren't considered a very high priority" in past decades, Thomas P. Dunne, the agency's acting assistant administrator for solid waste and emergency response, said in an interview. "But they are a concern now."

With the costs and scrutiny of mining on the rise in rich countries, where the best ores have been depleted, 70 percent of gold is now mined in developing countries like Guatemala and Ghana. It is there, miners and critics agree, that the real battle over gold's future is being waged.

Gold companies say they are bringing good jobs, tighter environmental rules and time-tested technologies to their new frontiers. With the help of the World Bank, they have opened huge mines promising development. Governments have welcomed the investment.

But environmental groups say companies are mining in ways that would never be tolerated in wealthier nations, such as dumping tons of waste into rivers, bays and oceans. People who live closest to the mines say they see too few of mining's benefits and bear too much of its burden. In Guatemala and Peru, people have mounted protests to push miners out. Other communities are taking companies to court.

This month a Philippine province sued the world's fifth-largest gold company, Canada-based Placer Dome, charging that it had ruined a river, bay and coral reef by dumping enough waste to fill a convoy of trucks that would circle the globe three times.

Placer Dome, which also runs three major mines in Nevada, answered by saying that it had "contained

the problem" and already spent $70 million in remediation and another $1.5 million in compensation.

Some in the industry have paused to consider whether it is worth the cost - to the environment, their bottom line or their reputations - to mine gold, which generates more waste per ounce than any other metal and yet has few industrial uses.

The world's biggest mining company, Australia-based BHP Billiton, sold its profitable Ok Tedi mine in Papua New Guinea in 2001 after having destroyed more than 2,400 acres of rainforest. Upon leaving, the company said the mine was "not compatible with our environmental values."

After tough lessons, other companies, like Newmont Mining, the world's largest gold producer, are paying for more schools and housing, trying harder to ease social problems around its mines.

"I don't think any of our members want to be associated with a bad operation - notwithstanding it would hurt their ability to open new facilities," said Carol L. Raulston, spokeswoman for the National Mining Association. "News goes around the world quickly now and there is no place to hide."

Critics say corporate miners have been cloistered from scrutiny because of their anonymity to consumers, unlike, say, oil companies, which also extract resources but hang their name over the pump.

Last year the mine watchdog group Earthworks began a "No Dirty Gold" campaign, marching protesters in front of fashionable Fifth Avenue storefronts, trying to change gold mining by lobbying gold consumers.

"They just said to ask where the gold was coming from and whether it caused social or environmental damage," said Michael E. Conroy, senior lecturer and research scholar at the Yale University School of Forestry and Environmental Studies. "The repercussions in the mining media were huge - some said it was all lies, but retailers began to realize what their vulnerability was."

Mr. Kowalski, Tiffany's chairman, has tried to stay ahead of the controversy. He has broken new ground by buying Tiffany's gold from a mine in Utah that does not use cyanide.

But the largest sellers of gold are not luxury outlets like his, but rather Wal-Mart stores, and even Mr. Kowalski, a trustee of the Wildlife Conservation Society, hesitated to call any gold entirely "clean."

Asia's Insatiable Appetite

Amrita Raj, a 25-year-old bride, was shopping for her wedding trousseau on a recent Saturday in New Delhi. There was a "wedding set" to be bought that day, with its requisite gold necklace, matching earrings and two sets of bangles.

For the sake of family honor, the new in-laws would have to receive gold gifts as well - a "light set" for the mother-in-law, plus a gold ring or a watch for the bridegroom, and earrings for a sister-in-law.

"Without gold, it's not a wedding - at least not for Indians," Ms. Raj said.

For thousands of years, gold has lent itself to ceremony and celebration. But now old ways have met new prosperity. The newly moneyed consumers who line the malls of Shanghai and the bazaars of Mumbai sent jewelry sales shooting to a record $38 billion this year, according to the World Gold Council, the industry trade group.

Over the last year, sales surged 11 percent in China and 47 percent in India, a country of a billion people whose seemingly insatiable appetite for gold - for jewelry, temples and dowries - has traditionally made it gold's largest consumer.

That kind of demand leads many in and out of the industry to argue that gold's value is cultural and should not be questioned. The desire to hoard gold is not limited to households in India or the Middle East, either.

The United States, the world's second-largest consumer of gold, is also the world's largest holder of gold reserves. The government has 8,134 tons secured in vaults, about $122 billion worth. The Federal Reserve and other major central banks renewed an agreement last year to severely restrict sales from their reserves, offering, in effect, a price support to gold.

That price is not simply a matter of supply and demand, but of market psychology. Gold is bought by anxious investors when the dollar is weak and the economy uncertain. That is a big reason for gold's high price today.

For miners that price determines virtually everything - where gold is mined, how much is mined, and how tiny are the flecks worth going after.

"You can mine gold ore at a lower grade than any other metal," said Mike Wireman, a mine specialist at the Denver office of the E.P.A. "That means big open pits. But it must also be easy and cheap to be profitable, and that means cyanide."

That kind of massive operation can be seen at Yanacocha, a sprawling mine in northern Peru run by Newmont. In a region of pastures and peasants, the rolling green hills have been carved into sandy-colored mesas, looking more like the American West than the Andean highlands.

Mountains have been systematically blasted, carted off by groaning trucks the size of houses and restacked into ziggurats of chunky ore. These new man-made mountains are lined with irrigation hoses that silently trickle millions of gallons of cyanide solution over the rock for years. The cyanide dissolves the gold so it can be separated and smelted.

At sites like Yanacocha, one ounce of gold is sprinkled in 30 tons of ore. But to get at that ore, many more tons of earth have to be moved, then left as waste. At some mines in Nevada, 100 tons or more of earth have to be excavated for a single ounce of gold, said Ann Maest, a geochemist who consults on mining issues.

Mining companies say they are meeting a demand and that this kind of gold mining, called cyanide heap leaching, is as good a use of the land as any, or better.

Cyanide is not the only option. But it is considered the most cost-effective way to retrieve microscopic bits of "invisible gold." Profit margins are too thin, miners say, and the gold left in the world too scarce to mine it any other way.

"The heap is cheaper," said Shannon W. Dunlap, an environmental manager with Placer Dome. "Our ore wouldn't work without the heap."

But much of those masses of disturbed rock, exposed to the rain and air for the first time, are also the source of mining's multibillion-dollar environmental time bomb. Sulfides in that rock will react with oxygen, making sulfuric acid.

That acid pollutes and it also frees heavy metals like cadmium, lead and mercury, which are harmful to people and fish even at low concentrations. The chain reaction can go on for centuries.

Many industry officials, reluctant to utter the word pollution, protest that much of what they leave behind is not waste at all but ground-up rock. The best-run mines reclaim land along the way, they say, "capping" the rock piles with soil and using lime to try to forestall acid generation.

But stopping pollution forever is difficult. Even rock piles that are capped, in an attempt to keep out air and rain, can release pollutants, particularly in wet climates.

Cyanide can present long-term problems, too. Most scientists agree that cyanide decomposes in sunlight and is not dangerous if greatly diluted. But a study by the United States Geological Survey in 2000 said that cyanide can convert to other toxic forms and persist, particularly in cold climates.

And just as cyanide dissolves gold out of the rock, it releases harmful metals, too.

There have also been significant accidents involving cyanide. From 1985 to 2000, more than a dozen reservoirs containing cyanide-laden mine waste collapsed, the United Nations Environment Program reported.

The most severe disaster occurred in Romania in 2000, when mine waste spilled into a tributary of the

Danube River, killing more than a thousand tons of fish and issuing a plume of cyanide that reached 1,600 miles to the Black Sea.

That spill led to calls for the gold industry to improve its handling of cyanide. After five years of discussion, the industry unveiled a new code this month. It sets standards for transporting and storing cyanide and calls on companies to submit to inspections by a new industry body.

But the cyanide code is voluntary and not enforced by government. And Glenn Miller, a professor of environmental science at the University of Nevada, says it does not adequately deal with one of mining's most important, unattended questions: What happens when the mine closes?

A Rocky Mountain Disaster

One answer can be found in a rural, rugged area of northeastern Montana called the Little Rocky Mountains.

There, Dale Ployhar often comes to the high bare slopes around the abandoned Zortman-Landusky gold mine to plant pine seedlings on a silent hillside that has been reclaimed by little more than grasses.

"I bring lodgepole seeds and scatter them around, hoping they'll come back," he said, looking out over the tiny town of Zortman, population 50.

Zortman-Landusky was the first large-scale, open-pit cyanide operation in the United States when it opened in 1979. The imprint it left on the environment, psyche and politics of Montana continues today.

What happened there - a cacophonous, multilayered disaster involving bankruptcy, bad science, environmental havoc and regulatory gaps - foreshadowed the risky road that gold has taken in the years since, mining experts, government regulators and environmentalists say.

"There's a lot of bitterness left," said Mr. Ployhar, 65, a heavy equipment operator, whose son bought some of the mine lands at a bankruptcy auction four years ago.

Some mining experts say that Zortman-Landusky - a combination of two open pits near Zortman and the neighboring village of Landusky - offered a steep learning curve on how chemical mining worked, and didn't.

Others say that overly ambitious production schedules by the mine's owner, Pegasus Gold, based in Canada, were to blame. A bonus package of more than $5 million for top executives, announced after the company filed for bankruptcy protection in 1998, did not help.

Mining with cyanide can be tricky even in the best conditions. At Zortman, the company made the

mistake of building their cyanide heaps atop rock that turned acidic. The cyanide and the acid mixed in a toxic cocktail that seeped from the mounds.

Mining stopped in 1996, and company officials insisted in their public comments over the next year that they wanted to be responsible corporate citizens and stay to clean up the property. But the price of gold was falling, then below $280 an ounce, and Pegasus closed its doors.

"This became one of the worst cases in Montana," said Wayne E. Jepson, manager of the Zortman project at the Montana Department of Environmental Quality. "But even as late as 1990, one of the last studies for Landusky predicted no acid in any significant amounts."

Environmental risks from hard-rock mines often turn out to be understated and underreported, according to two recent studies.

Robert Repetto, an economist at the University of Colorado, examined 10 mines in the United States and abroad run by publicly traded companies. All but one, he wrote in a June report, had failed to fully disclose "risks and liabilities" to investors.

The environmental group Earthworks examined 22 mines for a report it will publish in November. Almost all of them had water problems, leading it to conclude that "water quality impacts are almost always underestimated" before mining begins.

"The combination of the regulatory approach and the science is what creates inaccurate predictions," said James R. Kuipers, a consultant and former mining engineer, one of the authors of the study.

At Zortman-Landusky, the state wrote the environmental impact study itself, based primarily on information from the company, Mr. Kuipers said.

Montana and other big mining states still often depend on mining companies for much of the scientific data about environmental impact, or the money to pay for the studies, state and federal regulators say, mainly because government agencies generally lack the resources to do expensive, in-depth research themselves.

Some mine regulators defend the practice, saying that having scientific data supplied by companies with a financial interest in the outcome is not necessarily bad if the review is stringent.

"What is important to make the system work is that state and federal agencies have the wherewithal and expertise to look at the information," said Mr. Wireman of the Denver E.P.A. office.

But one lesson of Zortman is that good information is sometimes ignored.

In the early 1990's, an E.P.A. consultant and former mining engineer, Orville Kiehn, warned in a memo

to his bosses that not enough money was being set aside by the mine for water treatment.

Mr. Kiehn's opinion, vindicated today, went nowhere. The environmental agency had little legal authority then - and no more today - to protect the public from an operating mine except by filing a lawsuit, as it did in 1995 after Pegasus had already violated federal clean water standards.

The company settled the suit in 1996 and agreed to pay $32.3 million mostly to upgrade and expand water treatment.

At the time, state officials rejected the idea of squeezing Pegasus to put up more money. This spring, Montana's legislature created a special fund for water treatment to make up for it, for the next 120 years, at a cost of more than $19 million.

Washington is also coming to grips with the failure to plan for the cost of mining. The Government Accountability Office, the investigative arm of Congress, sharply criticized the E.P.A. in August for not requiring metal mines to provide assurances that they can pay for cleanups, a failure that it said had exposed taxpayers to potentially billions of dollars in liabilities.

For Montana, the Zortman experience was chilling. In 1998, as the catastrophe was making headlines across the state, voters approved the nation's first statewide ban on cyanide mining, halting any new gold projects. They renewed the ban last year.

Profit and Poverty

Today gold companies are striking out to remote corners of the globe led by a powerful guide: the World Bank.

The bank, the pre-eminent institution for alleviating world poverty, has argued that multinational mining companies would bring investment, as well as roads, schools and jobs, to countries with little else to offer than their natural resources. For the bank, which tries to draw private investment to underdeveloped lands, the logic was simple.

"We invest to help reduce poverty and help improve people's lives," said Rashad-Rudolf Kaldany, head of oil, gas and mining at the bank's profit-making arm, the International Finance Corporation.

The bank has worked both ends of the equation. At its urging, more than 100 cash-strapped governments have agreed to cut taxes and royalties to lure big mining companies, said James Otto, an adjunct professor at the University of Denver law school.

At the same time, the bank put up money for or insured more than 30 gold-mining projects, looking for profits.

Though mining was a small part of the bank's portfolio, it was not without controversy as accidents mounted. In one of the worst disasters, in 1995, a mine in Guyana insured by the bank spilled more than 790,000 gallons of cyanide-laced mine waste into a tributary of the Essequibo River, the country's main water source.

By 2001, the World Bank president, James D. Wolfensohn, imposed a two-year moratorium on mining investments and ordered a review of its involvement in the industry.

Emil Salim, a former minister of environment of Indonesia, led the study. "I said, up to now the International Finance Corporation was only listening to business," he said in an interview in Jakarta. "I said, so now let's give some voice to civil society."

Mr. Salim recommended reducing the use of cyanide, banning the disposal of waste in rivers and oceans, and giving communities veto power over mining company plans.

But the industry complained. And developing country governments said they liked the bank's loans to gold mines. In the end, the bank settled on more modest goals.

It pledged to make environmental impact statements understandable to villagers and to back only projects with broad community support. It also urged governments to spend mining companies' taxes and royalties in the communities near the mines.

But critics and environmental groups say the bank demands little from the mining companies in return for its money and its seal of approval.

The bank's guidelines for arsenic in drinking water are less stringent than those of the World Health Organization, and mercury contamination levels are more lenient than those permitted by the E.P.A., said Andrea Durbin, a consultant to nongovernmental groups pressing for tougher standards.

The International Finance Corporation is drafting new guidelines that will clarify what it expects from miners, said Rachel Kyte, its director of environment and social development.

But the draft rules give mining companies even more latitude, said Manish Bapna, the executive director of the Bank Information Center, a group that monitors the bank. They will make it easier for companies to evict indigenous people and to mine in some of the globe's most treasured habitats, he said.

Despite the World Bank's two-year review, little has changed, said Robert Goodland, a former director of environment at the bank who was an adviser on the study. "The bank insists on business as usual," he said.

Resistance in Guatemala

The first piece of new mining business the bank invested in after its review can be found today in the humid, green hills of western Guatemala.

Bishop Alvaro Ramazzini, a big burly man who mixes politics and religion with ease, doesn't understand why the World Bank lent $45 million to a rich multinational company for a gold mine in his impoverished region of Mayan farmers.

"Why not spend the money directly to help the people?" he asked.

Sprawled across a deep wooded valley, a new mine built by Glamis Gold, a Canadian company, was chosen by the World Bank last year as a new model for how gold mining could help poor people.

But the mine has faced protest at every turn.

At the June 2004 board meeting of the International Finance Corporation, there was considerable skepticism about its $45 million loan to Glamis.

Members questioned why a $261 million project was creating only 160 long-term jobs and giving money to a "well capitalized" company like Glamis at all, according to minutes of the meeting provided to The Times by a nongovernmental group opposed to the project.

Others were worried that the I.F.C. was relying too heavily on information from Glamis about the potential for pollution.

The World Bank had pledged to back only mines with broad local support. But on the ground in Guatemala, opposition boiled over last December.

Angry farmers set up a roadblock to stop trailers carrying huge grinding machines for the mine. After 40 days, and battles between police and protesters, the equipment had to be escorted by soldiers.

To persuade the villagers of the mine's benefits, Glamis flew 19 planeloads of farmers to a mine it runs in Honduras.

But the villagers of Sipicapa still wanted their voices heard. On a cool Saturday morning in June, more than 2,600 men and women dressed in their weekend best, with children in tow, crowded into the community's yards, churches and verandas to vote in a nonbinding referendum.

"We are already regretting that our forefathers allowed the Spaniards to buy our land for trinkets and mirrors," said Fructuoso López Pérez, a local mayor. "So we should vote so our children will thank us for doing right."

At that, a church full of local people raised their hands in a unanimous show of opposition to the mine.

Much of the peasants' fury was informed by Robert E. Moran, an American hydrogeologist, who was asked by Madre Selva, a Guatemalan nongovernmental organization, to visit the mine and review its environmental impact statement.

Mr. Moran, who was on the advisory board of the bank's mining study, found it badly lacking. It did not address the "very large quantities of water" the mine would use, or give basic information on the "massive volumes" of waste the mine would produce, he said.

Tim Miller, vice president of Central American operations for Glamis, said the environmental impact statement had been a "working document."

In Guatemala City, the Vice Minister of Mining, Jorge Antonio García Chiu, defended approval of the mine, saying it followed four months of consultation.

Mr. Kaldany, the I.F.C. official, said the investment and the environmental impact statement were both sound. "We are a bank," he said. "We go on the basis of a business development project. Then, as well, the bank asks: Are we needed? Are we adding any value?"

Glamis had already spent $1.3 million on social programs in the villages as part of the bank's requirements, Mr. Kaldany said.

At the mine, the grinding and churning of new machinery being tested already echoes across the valley. Production could begin as early as November.

Mr. Miller, of Glamis, said the mine was a winner for the people, and his company. In fact, he said, Glamis didn't need the bank, the bank came to Glamis.

Bank officials "were anxious to make some investments" in the region, he said. The company is expecting to gross $1 billion over the life of the mine, with profits of $200 to $300 million.

"That's a return of about 25 to 30 percent," he said.

Ghana: The Social Costs

The men of Binsre on Ghana's ancient Gold Coast carry on their own hunt for gold. Nearly naked, their arms and legs slathered in gray ooze, they sift through the muck in a large pit, using buckets and hard hats, looking for any last scrap.

So far industrial mining has not lived up to its promise for these men and their families. They are illegal

miners who find work not inside the highly mechanized mines of Ghana's first-world investors, but on the fringes, scavenging the waste left behind by AngloGold Ashanti, the world's second-largest gold company, based in South Africa.

Six miners have died in the last several years, most of them overcome by fumes when waste from the mine gushed into the pit, said Hannah Owusu-Koranteng, an advocate for the illegal miners. The mine tried to keep the men out.

"We used to use dogs," said AngloGold Ashanti's chief financial officer, Kwaku Akosah-Bempah. "Then they said we were using dogs to bite them." So the mine stopped using the dogs and the men returned.

In the nearby village of Sanso, a few men said they had lost their land to the mine. Now they carve shafts into a mountain of waste rock, where they haul, hammer, chip and sift.

"You wake up one day and you realize your farm is destroyed," said Assemblyman Benjamin Annan, a local politician. "They say they will compensate but it takes one or two years. So people are compelled to go to illegal mining, the way our ancestors did."

Industrial-size shaft mining has existed in Ghana for 100 years, but with the price of gold soaring, more companies are arriving now, this time bringing open-pit cyanide mines. The investment has been greeted warmly by the government.

Newmont is set to spend a billion dollars on a new mine next year and on a second mine - in one of the badly deforested country's last remaining forest preserves - in 2007.

The World Bank is here, too, preparing to lend the company $75 million. Together, the bank and Newmont say, they aim to show how social development and gold mining can be married.

Newmont compensated the farmers who were moved off their land. It is offering training for new jobs, like growing edible snails and making soap. It built new concrete and tin-roofed houses to replace homes made of mud.

But the mine will create just 450 full-time jobs. More than 8,000 people will be displaced.

"The house is O.K.," said Gyinabu Ali, 35, a divorced mother of five children, who recently moved into her gaily painted two-room house, with a toilet out back, that overlooks several dozen similar units resembling a poor man's Levittown. "I miss my land where I could grow my own food."

Near the mine of Newmont's competitor, AngloGold Ashanti, in Obuasi, only half of the homes have an indoor bathroom, and 20 percent have running water. With the exception of the brick villas of the company executives, Obuasi today looks like a vast and squalid shanty town.

The chief financial officer, Mr. Akosah-Bempah, said he was offended by the poor conditions. Most of the company's taxes and royalties had stayed in the capital, he said, leaving the ramshackle town bereft of the benefits of gold mining.

"Sometimes we feel embarrassed by going to Obuasi," he said. "Not enough has gone back into the community."

Somini Sengupta contributed reporting from New Delhi for this article.